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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/754,027	01/08/2004	Sung-Koog Oh	5000-1-436	6075
33942	7590	10/19/2005		
CHA & REITER, LLC 210 ROUTE 4 EAST STE 103 PARAMUS, NJ 07652			EXAMINER PAK, SUNG H	
			ART UNIT	PAPER NUMBER
			2874	

DATE MAILED: 10/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/754,027

Applicant(s)

OH ET AL.

Examiner

Sung H. Pak

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Applicants' response filed 8/04/2005 has been carefully studied by the examiner, and all pending claims have been reconsidered in view of the arguments set forth in the response. However, the examiner maintains the ground of rejection provided in the previous office action. Please refer to Response to Arguments for details.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-15, 20-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Hasegawa et al (US 6,718,105 B2) as discussed in the previous office action.

Hasegawa discloses an optical device with all the limitations set forth in the claims, including: a cylindrical or rod-shaped substrate with a plurality of holes longitudinally formed therethrough in a photonic lattice structure (abstract, Fig. 1: optical fibers are rod/ cylinder shaped); a plurality of longitudinal material members having at least two different indices of refraction, the members being disposed in the holes (Fig. 1; column 3 lines 33-47); wherein distribution of index of refraction of the photonic crystal fiber and fiber preform is controlled by arrangement of the members (arranged in hexagonal or square lattice; column 3 lines 28-42; column 6 lines 22-30);

Art Unit: 2874

wherein each of the members is formed in the shape of a rod, the rod being inserted in the corresponding hole ('6' Fig. 1);

wherein each of the holes and members is formed in the shape of a cylinder, the member being inserted in the corresponding hole ('6' Fig. 1);

wherein the index of refraction of the members monotonically decreases from the center of the fiber or preformed to the outer circumference (Table 2, example 1);

wherein the index of refraction of the members monotonically increases from the center of the fiber or preform to the outer circumference (Table 2, example 6);

wherein the index of refraction of the members monotonically either decreases and then increases or increases and then decreases from the center of the fiber or preform to the outer circumference (Table 2, examples 3-4);

wherein the substrate is made of material containing pure silica (column 3 lines 43-47);

wherein the substrate is made of a material containing silica and a dopant having a predetermined index of refraction (column 6 lines 10-21);

wherein the relative index of refraction of each of the members to pure silica is a predetermined percentage (column 6 lines 10-21);

wherein each of the members is formed in the shape of a cylinder having a diameter smaller than that of the cylindrical substrate (Fig. 1).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2874

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 16-19, 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa et al (US 6,718,105 B2) in view of Jakobsen et al (US 2004/0179796A1) as discussed in the previous office action.

Hasegawa discloses an optical device with all the limitations set forth in the claims as discussed above, wherein plurality of holes are disposed in a single unitary fiber substrate. Although the substrate may have plurality of regions having different optical properties, Hasegawa does not explicitly teach the use of a separate outer substrate and separate inner substrate fitted in the outer substrate.

On the other hand, Jakobsen explicitly teaches the use of separate inner substrate being fitted in the outer substrate of the photonic bandgap fiber (paragraph 0147). Such arrangement is considered advantageous and desirable in the art because it allows for inner and outer portions of the resulting fiber to have distinct optical properties (such as index of refraction), which are clearly and precisely bound and defined along the boundaries. This would not be possible

Art Unit: 2874

without the use of separate inner and outer substrate layers, since imparting different optical properties through dopant diffusion cannot achieve very precise and clearly cut border.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Hasegawa device to have a separate outer substrate and separate inner substrate fitted in the outer substrate.

### ***Response to Arguments***

Claims 1, 10, 20, and 29 stand rejected under 35 USC 102(e) as being anticipated by Hasegawa et al (US 6,718,105).

Starting on page 10 of the applicants' response, it is argued that "Hasegawa, as read by applicant, teaches... voids... filled with one of either gas or liquid..." (page 10, paragraph 5).

Applicants then conclude that Hasegawa does not disclose "members having at least two different indices of refraction" as claimed in the instant application.

The examiner respectfully submits that applicants' reading of the Hasegawa reference is unduly narrow, and that Hasegawa fully anticipates the claimed limitation of the instant application. Specifically, Hasegawa states:

In the optical fiber according to the present invention, by a proper design of the refractive indices of the main mediums and the sub mediums, the mean refractive index distribution in the cross section of the optical fiber can be formed **without** adjusting the areas of the sub mediums per unit cross-sectional area. (emphasis added); (column 3 lines 55-60)

Hasegawa further states:

On the other hand, according to the present invention, the mean refractive index can be decreased by **decreasing at least one of material refractive indices** of the main mediums and the **sub**

Art Unit: 2874

mediums, the mean refractive index can be increased by increasing those material refractive index whereby the range of the mean refractive index that can be realized can be broadened. (emphasis added); (column 4 lines 6-12).

Therefore, it is clear that one of the objective of Hasegawa's teaching was to select refractive indices of various "sub mediums" (equivalent to "members" recited in the present application), such that desired refractive index distribution of optical fiber cross section is attained. As such, Hasegawa reference cannot be read to limit the sub medium material to only one of listed materials, and to do so would be unreasonable or unduly narrow.

Further, applicants argue that Hasegawa's optical fiber is "unable to control the refractive index distribution by arrangement of the members." (page 11, first full paragraph)

The examiner respectfully submits that Hasegawa does show establishment of refractive index distribution by "arrangement of the members." As shown in Figures 1, 9, and 10, the 'members' in Hasegawa are 'arranged' in predetermined lattice structures. And, as discussed above (referring to column 4 lines 6-12), the refractive index distribution depends on the refractive indices of sub medium materials. Thus, the 'arrangement' as well as the refractive indices of sub medium materials determine the resulting overall refractive index distribution.

Accordingly, the examiner maintains the ground of rejection presented in the previous office action.

Claims 16 and 35 stand rejected under 35 USC 103(a) as being obvious over Hasegawa in view of Jakobsen et al (US 2004/0179796 A1).

Art Unit: 2874

Applicants argue, “Nowhere in Jakobsen is there a teaching of plurality of longitudinal material members with at least two different refractive indices arranged in photonic lattice structure.” (page 12, first full paragraph)

The examiner respectfully submits that Hasegawa fully anticipates such limitation and the ground of rejection provided in the previous office action is valid.

Accordingly, the examiner maintains the ground of rejection presented in the previous office action.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.



Art Unit: 2874

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak  
Primary Patent Examiner  
Art Unit 2874